

Digital Images

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Digital Images

1 INTRODUCTION

- A. Digital capture is used for the true and accurate recording of images, such as latent prints and known prints, while digital processing is used to improve the quality of friction ridge print images in a controlled and repeatable manner.
- B. This document addresses the capture, processing, output, storage, and security of digital images for friction ridge print examination.
- C. Requirements for digital images or processing in the Next Generation Identification System are documented in *the Next Generation Identification System* ([FRD-600](#)).

2 SCOPE

These procedures apply to appropriate personnel in the Friction Ridge Discipline, Operational Projects Unit, and Evidence Management Unit who create and/or utilize digital images as part of their current position, have received the appropriate training, and are supporting Friction Ridge Discipline casework.

3 LIMITATIONS

None

4 REQUIREMENTS FOR DIGITAL IMAGES

4.1 Captured Friction Ridge Prints

- A. Digital images of friction ridge prints captured by personnel in the Friction Ridge Discipline, Operational Projects Unit, and Evidence Management Unit in support of Friction Ridge Discipline casework must include (documentation may be in written or electronic format):
 - o Documentation of image source (e.g., item number, known card, substrate).
 - o Documentation of capture device (e.g., scanner, digital camera).
 - o Documentation indicating the image or photograph is an original capture, either through documentation in the FBI Laboratory file or through the file metadata.
- B. The following file properties, recorded in the FBI Laboratory file or by the file metadata, are strongly recommended; however, not meeting these recommendations does not render the image unusable for examinations.
 - o A file format without compression or with lossless compression (e.g., RAW, TIFF) or with WSQ compression saved at a maximum of 15:1.
 - o A minimum of 8 bits per channel (8 bit for grayscale images and 24 bit for RGB color images).
 - o A resolution that meets or exceeds 1000 ppi when converted to actual size (1:1) for latent prints and non-standard intentionally recorded prints
 - o A resolution that meets or exceeds 500 ppi when converted to actual size (1:1) for standard intentionally recorded prints.

- C. All images should be viewed to confirm the information is sufficient for examinations and prints recaptured, if possible.

4.2 Images of Friction Ridge Prints Submitted to the FBI Laboratory

Personnel will refer to the *Case Acceptance* ([FRD-200](#)) for submitted digital evidence.

4.3 Requirements for Digital Images of Object Shots Captured in the Laboratory

- A. Object shots of items that require a questioned document examination must be captured at a minimum resolution of 400 ppi when converted to actual size (1:1), and the captured image must contain a scale.
 - 1. When requesting capture by forensic imaging personnel, a resolution of 400 ppi or higher must be specifically asked for by the requestor.
- B. All other object shots may be captured in the manner best suited for the object in question.

5 REQUIREMENTS FOR DIGITAL IMAGE PROCESSING

- A. The original image will remain unaltered.
- B. A working copy of the original image will be created and used for digital processing to preserve the integrity of the original image.
- C. Digital image processing must not misrepresent nor compromise the integrity of the friction ridge print information contained in the original image.

5.1 Limits for Digital Image Processes

- A. Digital image processes that cannot be used on a working image include, but are not limited to:
 - Cloning/Healing tools
 - Airbrush
 - Paintbrush
 - Paint bucket
 - Eraser
 - Vector based tools
 - Filters (except Chromatic FFT/Calibration)
 - File format conversion involving a lossy compression (e.g., TIFF to JPEG)
- B. Dodge/burn may be used but must not isolate less than five ridges or be applied in the direction of the ridge flow.

5.2 Clarification of Digital Image Tools

- A. Reversing the color and reversing the position are considered digital processing and must be tracked in the digital history.
- B. Resizing an image is not considered a digital process.

6 REQUIREMENTS FOR IMAGE OUTPUT

- A. An output device must be capable of producing a visually accurate representation of the input image.

- B. Unless materials are not available, images will be printed on glossy or photo-quality paper.
- C. Personnel will utilize a printing method that produces the best quality images (e.g., printing latent prints directly from the printer).

6.1 Reducing Resolution for Printing

- A. As necessary, personnel may reduce the resolution in order to produce an image of suitable file size to be printed on digital printers.
- B. This image is not required to be retained and personnel are not required to record the action in the FBI Laboratory file.
- C. Any retained image files must be clearly marked as such and used only for printing.

7 REQUIREMENTS FOR DIGITAL IMAGE RETENTION SYSTEMS

- A. All digital imaging casework will be conducted in the appropriate digital image retention system as designated by management.
- B. Exceptions include work conducted in the Next Generation Identification System or situations listed in [Section 7.2](#).
- C. The digital image retention system is considered a part of the FBI Laboratory file and all work performed within the system will follow the guidelines below:
 - 1. System case identifier must be recorded in the FBI Laboratory file outside of the digital image retention system and should be related to the request (e.g., Laboratory Number or Incident Number).
 - 2. All images should be directly captured into the system.
 - i. Images unable to be captured directly will be imported into the digital image retention system without additional change or alteration from original capture.
 - 3. Original image(s), all final processed image(s), and digital history must be retained.
 - 4. All digital capture and processing work conducted in the digital image retention system must be clearly associated with the appropriate individual.
 - 5. Each image must be associated with its respective item identifier (if assigned).
 - 6. Captured images that are not to be used for examination (i.e. retained test image) will be so designated.

7.1 Image Deletion in Digital Image Retention System

- A. Images will not be deleted from a digital image retention system.
- B. However, situations may arise that necessitate the removal of one or more images from the system (e.g. system errors, classification, or personnel oversight) for clarity or continuity.
- C. Prior to deletion, personnel will attempt to confirm the image and any available asset information are retained or recaptured in the FBI Laboratory file.

- D. A notation will be included in the digital image retention system case that states why the image was deleted, who performed the deletion, and when the image was deleted.
- E. If the image and/or asset information cannot be confirmed to be retained elsewhere in the FBI Laboratory file, a notation will be added to the digital image retention system case.

7.2 Conducting Work Outside the Digital Image Retention System

- A. Digital imaging casework may be conducted outside of the system in specific situations.
- B. See [Section 7.2.1](#) if the system is temporarily unavailable or the work is related to a Scientific Review Board, or [Section 7.2.2](#) if the digital image retention system cannot be used at all for capture and/or processing.

7.2.1 Requirements for When the Digital Image Retention System is Temporarily Unavailable or for Work Conducted for a Scientific Review Board

- A. The system may be temporarily unavailable due to issues with the location or the system itself, or a Scientific Review Board is active and shall work outside the system to limit contextual information.
- B. A notation will be added to the FBI Laboratory file indicating the system is unavailable and why unless associated with a Scientific Review Board.
- C. The original file, final processed file, and the digital processing history (either digitally or through written documentation) will be retained.
 - 1. Casework file names will be associated with the Laboratory number.
 - 2. Scientific Review Board file names will use a unique identifier.
- D. Original and processed files must be clearly distinguishable and easily connected to each other.
- E. Information will be temporarily retained on digital media or stored on a drive.
 - 1. The temporary storage is not considered the final record.
- F. Each image must be associated with its respective item identifier (if assigned) (e.g., adding item identifier to the file name).
- G. Captured images that should not be used for examination will have some designation stating the images are not to be used for examination.
- H. Any retained digital images and history must be imported into the appropriate digital image retention system once the system is restored or the Scientific Review Board has concluded.
- I. Once the images have been successfully uploaded into the digital image retention system, any temporary digital media do not need to be retained in the FBI Laboratory file.
- J. The FBI Laboratory file must reflect the retention of images and disposal of temporary digital media, as appropriate.

7.2.2 Requirements for When the Digital Image Retention System Cannot be Used Due to Case Details

- A. Situations occur where work cannot be conducted in the digital image retention system nor can images be imported to the system (e.g., classification issues, Foreign Intelligence Surveillance Act cases, some Confidential Human Source cases, and some Terrorist Explosive Device Analytical Center cases).
- B. In the event that a digital image must be captured and/or processed outside of the digital image retention system, the original file(s), final processed file(s), and the digital processing history (either digitally or through written documentation) will be retained in the FBI Laboratory file.
 - 1. File names will be associated with the Laboratory number.
- C. Original and processed files must be clearly distinguishable and easily connected to each other.
- D. Each image must be associated with its respective item identifier (if assigned).
 - 1. Examples of this include adding the item designation to the file name or retaining the images under a folder bearing the item designation.
- E. Captured images that should not be used for examination will have some designation stating the images are not to be used for examination.
- F. In such situations where images will not be uploaded into the digital image retention system at any time, images and history will be recorded to digital media for retention in the physical FBI Laboratory file.
- G. The digital media will be retained and personnel will note in the FBI Laboratory file where the digital media is retained.
- H. Personnel will refer to the appropriate documents to determine if secondary evidence is required.

8 REQUIREMENTS FOR IMAGE STORAGE ON DIGITAL MEDIA

- A. Any digital files retained in the physical FBI Laboratory file must be recorded on digital media.
- B. All digital media used must have some mechanism to prevent the addition to or changing of files after the initial recording session.
- C. The user should confirm digital files were successfully recorded.
- D. Retained digital media will be labeled with, at a minimum, the following information:
 - o Laboratory number(s)
 - o Date file(s) recorded to the digital media
 - o Classification level
 - o Handwritten initials of issuing examiner (if applicable)
 - o Handwritten initials of FBI Laboratory personnel responsible for the capture and/or the digital processing of the retained images.
- E. A record of all item numbers stored on the retained digital media must be preserved in the FBI Laboratory file.

1. Personnel may write the item identifiers on the digital media, record the identifiers in the case notes, or retain a print out of the image files with the item identifiers.
 2. It must be clear which item identifiers are contained on which digital media.
- F. Personnel may consolidate files to a smaller number of discs or other digital media, but no required images may be omitted.
1. The creation of the new digital media and any disposal of the original digital media must be recorded in the FBI Laboratory file, and all personnel who initialed the original digital media must initial the consolidated digital media containing their work.
 2. Personnel may also retain the original digital media.
 3. If the original digital media is retained, the handwritten initials of personnel responsible for the capture or processing are not needed on the final digital media.

9 REQUIREMENTS FOR DISCOVERY REQUESTS OR TESTIMONY

- A. When a request is made for the FBI Laboratory File, the examiner must provide a copy of the images contained in the FBI Laboratory file in addition to the digital processing history or digital assets of all images.
- B. Digital images used for demonstrative purposes in testimony must be true representations of the evidence.
- C. Illustrative aids (e.g., lines, letters, labels) may be applied to the image to demonstrate the Analysis, Comparison, and Evaluation process.

10 PROCEDURES FOR DIGITAL IMAGES SUBMITTED BY A CONTRIBUTOR

10.1 Submitted Digital Files

- A. The FBI Laboratory file will contain a copy of every electronically submitted file that passes the virus scan (e.g., disc, email) or is retrieved from FBINET.
 1. Ideally, the files will be retained in the digital image retention system; however, other means are acceptable, such as retaining a copy of the images on digital media, in MorphoBIS, or in Sentinel.
 2. A hardcopy of the file will not meet the requirement.
- B. If the images were submitted by email, a copy of the email will be retained in the FBI Laboratory file.
- C. Images that will not be used for examination (e.g., object shots, duplicate images, non-evidentiary images) will be designated as such.
- D. For each file submitted electronically, the FBI Laboratory file will record the date or date range when the images were examined as well as who conducted the examination.
 1. File names will be associated with the Laboratory number and original file name (folder names are acceptable).
 2. Original and processed files must be clearly distinguishable and easily connected to each other.

- E. All digital capture and processing work conducted in the digital image retention system must be clearly associated with the appropriate individual, and all work must be clearly associated with the appropriate individual.

10.2 Submitted Images of Latent Prints and Non-Standard Intentionally Recorded Prints

Within the FBI Laboratory file, each suitable for comparison print must be associated with the original contributor file name of the image (and image source if available).

10.3 Submitted Images of Standard Intentionally Recorded Prints

If all recordings of all fingers within the submitted image(s) of a standard intentionally recorded print(s) are not suitable for comparison, the analysis will be recorded in the case notes.

11 DIGITAL IMAGES CAPTURED BY PERSONNEL LISTED IN SCOPE

- A. All captured images will contain a verified scale or other measurable item as described in [Section 12](#).
- B. Meeting the requirements for digital capture and/or processing will be the responsibility of the party capturing the image and/or conducting the digital processing.
- C. The Laboratory number, date, process (if applicable), and item identifier must be associated with each image, and, if possible, all information on an identifier tag will be recorded.
- D. It is not necessary to maintain any exploratory images or test images in the FBI Laboratory file.
- E. When using the digital image retention system, if personnel determine that an image will not be used for examination, the image will be designated as such (includes both the original and any applicable digitally processed versions) in the FBI Laboratory file.
- F. For all captured images, the following must be contained in the FBI Laboratory file:
 - o Copy of the original captured image
 - o Date the original image was captured
 - o Name of individual who captured the original image
 - o Copy of the final processed image, if applicable
 - o Processing history, including date(s) of processing, if applicable
 - o Name of individual(s) who conducted any digital processing
- G. All actions must be clearly associated with the person who performed them.

11.1 Analysis/Comparison/Evaluation Work

- A. Examiners may mark information on images in conjunction with any part of the Analysis, Comparison, and Evaluation process.
- B. Examiner will follow requirements in Section 7 if capturing or scanning a print(s).
- C. If the examiner uses existing digital images, any digital processing must occur through the digital image retention system and the additional digital processing will be retained.

- D. Images that cannot be retained in a digital retention system will be captured, processed and/or retained as detailed in [Section 7.2](#).
- E. Annotations made to document any part of the Analysis, Comparison, and Evaluation process are not considered digital processing; however, a record of final annotations must be retained in the FBI Laboratory file.
- F. If annotations are retained within a digital image retention system or on digital media, all work must be clearly associated with the individual who performed it.

12 IDENTIFIER TAGS OR SCALE VERIFICATION

12.1 Identifier Tags Produced By Vendor

- A. Each batch of identifier tags received from the printing vendor will be measured against American National Standards Institute /National Institute of Standards and Technology rulers to ensure the accuracy of the size of the scale after printing.
- B. Tags on the first and last page, and at least every 500th sheet (full sheet or strip) will be measured.
- C. In capture systems where measured tags cannot be used, the system ruler will be measured against the ruler and recorded either in a log book or in the case notes.
- D. These measurements and checks will be tracked by the Standards and Practices Program Manager and the Huntsville Laboratory Manager.

12.2 Identifier Tags Produced By Personnel

- A. Personnel must use measured or checked identifier tags or must verify the size of any tags they create using the American National Standards Institute /National Institute of Standards and Technology rulers.
- B. If a measurable item is used for a scale in images captured in the FBI Laboratory, the value for the measurable item must be taken with the rulers.
- C. These checks must be recorded in the FBI Laboratory file.

13 TERRORIST ANALYSIS GROUP KNOWN STANDARD LIBRARY

- A. The Terrorist Analysis Group Known Standard Library consists of fingerprints and secondary biometrics, submitted to or obtained by the Latent Print Operations Unit, of individuals suspected of involvement in terrorist activities and/or major cases.
- B. The Terrorist Analysis Group Known Standard Library is not considered an individual characteristic database or reference collection and is maintained by the Latent Print Operations Unit at the FBI Laboratory in Quantico.
- C. The Terrorist Analysis Group Known Standard Library currently consists of digital captures of the following known recordings:
 - o recordings taken by Friction Ridge Discipline personnel of persons of interest in major cases;
 - o originals, negatives, and/or copies of records that have been submitted to the Laboratory as part of a case; and
 - o composite records of identified known or latent prints.

- D. All records, with the exception of the composite records, contained in the Library are also retained in the Next Generation Identification System.
- E. The Terrorist Analysis Group Known Standard Library is an extension of the FBI Laboratory file as long as the case notes clearly indicate that the records were retrieved from the Terrorist Analysis Group Known Standard Library.

13.1 Retention of Friction Ridge Recordings

The retention of records in the Terrorist Analysis Group Known Standard Library is at the discretion of the Major Case Coordinator.

13.2 Composite Records

- A. Composite records will be generated from identified and verified prints from casework.
- B. For each print recording on a card, the card will list the lab number including case record number where the print was identified and verified.
- C. The card will be filed under a Universal Control Number or other unique identifier.

13.3 Remaining Records

- A. All remaining digital recordings within the Terrorist Analysis Group Known Standard Library have at least one unique number:
 - o Internment Serial Number,
 - o Universal Control Number, or
 - o legacy Integrated Automated Fingerprint System Identification number.
- B. The Universal Control Number will either be verified by Criminal Justice Information Services Division or verified and documented by Friction Ridge Discipline personnel on a printout of a record from the Integrated Automated Fingerprint Identification System or the Next Generation Identification System that is maintained in the library.
- C. If no Universal Control Number exists for the individual, the original cards or a copy is provided to the Criminal Justice Information Services Division, who will generate a Universal Control Number for those submissions that meet its criteria.
- D. The digital copies in the Terrorist Analysis Group Known Standard Library are filed by Universal Control Number.
- E. If there is no Universal Control Number, then they will be filed by legacy Integrated Automated Fingerprint Identification System number.

13.4 Requests for Copies of Records Retained in the Terrorist Analysis Group Known Standard Library

The Major Case Coordinator will ensure requests for copies of records retained in the Terrorist Analysis Group Known Standard Library will be answered and may be forwarded to Criminal Justice Information Services Division for dissemination.

14 REVISION HISTORY

Revision	Issued	Changes
14	04/7/2020	Latent Print Units changed to Friction Ridge Discipline throughout document as well as other appropriate changes with similar terms. Minor wording, grammar, reorganization of material, and punctuation changes in document. Reorganized sections and renumbered and renamed as appropriate. Section 1, removed extraneous paragraph, clarified coverage of work, and changed affected personnel. Removed specific listing in Section 2 and updated for added personnel. Section 3.1, updated affected personnel, consolidated all capture sections and lessened requirement for file properties with added caveats. Section 3.4, removed specific filter type and added clarification on reverse color and position. Section 3.5, clarified expectations for printed images, modified Quantico network requirements to a more generalized statement. Section 3.6, generalized content and second bullet point, replaced direct capture requirement with direct upload requirement. Section 3.6.1, generalized reason for deletion requirement. Section 3.7 through Section 3.7.2, three sections were reorganized and further clarification on expectations added. Section 3.7.3, content broadened to include all digital media with caveats and restrictions added. Section 4.1.1, changed and clarified retention requirements. Section 4.2, Title changed to specify who is affected by requirements and added date(s) of processing requirement. Section 4.2.1, clarification added on retention. Section 6.2.2 (old), removed. Section 5, broaden sources and responsibility clarified. Section 6, composite records added. Section 6.1, removed designee. Added Section 6.1.1 and created new Section 6.1.2 with existing information. Section 13, updated.
15	09/15/2022	Remove Equipment. Remove JPEG2000 limitations. Remove Adobe Photoshop Actions reference. Section 7-C-1 – Clarified intent. Section 7-C-4 and Section 10.1-E - Removed individual login requirement. Section 7.2.1-C-2 – Added unique identifier for Scientific Review Board. Section 10.2 – Streamlined for clarification. Section 11.1-B – Streamlined for clarification.